Assessing The Health Hazards Present in Open Air Markets and The Effects They Pose: A Case Study of Markets in Narok Town

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Abstract

The growth of open-air markets has been on the rise both globally and locally. Narok town has also had its fair share of growth in open air markets. These open-air markets are, however, associated with various health hazards which end up posing a threat to the health of the people working in these markets and the environment at large. This study aimed at identifying the health hazards in the two major open-air markets, that is, ODM and Muthurwa open-air markets and the health effects they pose. The objectives for this were to determine the public health hazards and risks in these markets, how these hazards affect the health of people working in these open-air markets, to determine the levels of knowledge and awareness of public health standards and requirements among the market and to suggest possible recommendations on how to improve the working conditions in these open air markets. A self-administered, semi-structured questionnaire was administered to the target population and was duly filled. From the results obtained from the study, it is evident that there is are public health hazards present in these markets which tend to affect the health of the people working in these markets and the environment to some extent. Although, a few people in the markets are aware of the public health standards in the markets, there is still inadequate information and different levels of awareness that need to be improved in these markets. The working conditions need to be improved to ensure the comfort of the people who work in these markets as well as those visiting the markets. This study concluded that these major open-air markets in Narok town face myriad challenges that need to be mitigated by all the stakeholders associated with these markets to help reduce these hazards that affect the people working in them. It was recommended that similar studies be replicated in other open-air markets in the country to compare with the findings of this study.

Keywords: *Open-air markets, Health hazards, Public Health, Narok*

1. INTRODUCTION

An open-air market is a public place where food and merchandise are sold. They are places set aside by the government where people meet to buy and sell goods (List, 2009). They mostly comprise of stalls in the open in a marked area where business people are required to bid for the stalls and they are owned by the County government. Open-air markets are the main centers of business in many towns due to their preference by most groups of people in the society (List, 2009).

According to Tangires (2005) great markets make great cities and vice versa. Since antiquity, cities throughout the world have established markets to provide shelter for buyers and sellers and to protect and promote the trade in fresh food. Contrary to modern notions of cleanliness and hygiene, the open sheds with food exposed to the elements represented positive qualities in a market. History has shown that the city was the chief sponsor of markets. A city was inconceivable without a public market and a market could not exist without a city (Tangires, 2005).

Chatuchak Market in Thailand is the largest open-air market in the world (Wejwithan et al., 2017). It is preferred by many individuals because the prices are good and there is need to bargain if the price is not shown. The market is also easily accessible. However, the market is only open during the weekends and thus it poses a couple of health risks, because it is very crowded, hot and stuffy. According to Babatunde (2017), Karatina open air market in Kenya is the largest open-air market in East Africa. It is well known for the fresh fruit and vegetables available on sale. It also has a variety of goods, ranging from all types of cereals and many other market goods. The market has adequate stalls to accommodate traders. The Karatina town council manages the market and is working towards modernizing the market (Babatunde, 2017).

Kenya is a developing country, with the major open-air markets in Nairobi city. All towns in the country whether major or small towns have open air markets where most buying and selling activities take place (Cherono & Otieno, 2016). All Kenyans have the right to clean and healthy environment by the constitution, therefore the National Environmental Management Authority (NEMA), and the local authorities have been charged with the responsibility to ensure that all individuals work in healthy environments. Millions of people in Kenya prefer purchasing their products from open-air markets due to their affordability. They are relatively cheaper compared to other markets (Mwithirwa, 2010). Open-air markets have been increasing and growing in different parts and towns of the country. Narok town is a fast-growing town and is not an exception with the growth of open-air markets. The major open-air markets in Narok town include Muthurwa market and Narok Main market (ODM), although there are other small markets in the town. This research was focused on identifying the health risks and hazards that the individuals working in these major open-air markets face and how these hazards affect them. This information will be useful in creating awareness on the importance of working in healthy markets.

2. MATERIALS AND METHODS

2.1. Research Design

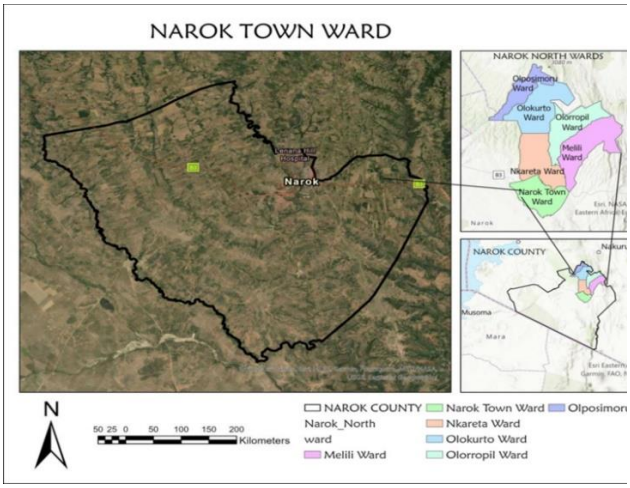
This study adopted a descriptive cross-sectional research design to investigate the public health risks and hazards faced by traders in the Muthurwa and ODM open-air markets in Narok. A cross-sectional design

was appropriate because it provided a snapshot of the existing conditions at that single point in time, enabling researchers to assess health risks and their impact on the traders effectively.

2.2. Extent and Description of the Study area

This study was conducted in the two major Narok town open air markets, that is, Muthurwa market and ODM market.

Narok is a town west of Nairobi, along the Great Rift Valley. It is the district capital of Narok County and stands as the major center of commerce, and other various economic activities. The geographical coordinates of the town are, 1.083 degrees south and 35.867 degrees east. Below, is a map showing a representation of Narok town where both markets are located.



Map of Narok Town

2.3. Types and Sources of Data

The type of data used in this research is both primary data and secondary data. Primary source include data that was collected during the field survey using questionnaires. Secondary sources of data constitute mainly of literature review. These two types and sources of data will thus be used to get information in this research.

2.4. Study Design

The research used a descriptive cross-sectional study using traders that is, the vendors in the open-air markets as population-based study groups. It was useful because it provided a quick snapshot of what was going on with the variables of interest for the research problem (Thomas et al., 2005). The technique that was used under this design was survey, with the use of a questionnaire due to limited time and resources to conduct a census study.

2.5. Sample Population

The target study sample population comprised of all traders, that is, the sellers who had been trading in the two markets within the last six months. Traders' groups were selected according to the type of commodities they sold in the market and the most targeted, were those who sold foodstuffs.

2.5.1. Sample Size Determination

The sample used was to help in producing the findings that can be generalized to the target population who are the traders in the two open air markets. According to Singh & Masuku (2014), this equation was developed to yield a representative sample of the large sample.

$$n = \frac{N}{1 + Ne^2}$$

Where

N is the population size

n is the sample size

e is error= 0.1 (Singh & Masuku, 2014).

Therefore, the sample size will be determined as follows:

Assuming the total number of traders in both markets are 200,

$$n = \frac{200}{1 + 200(0.1)^2}$$

$$n = \frac{200}{3}$$

$$n = 66.7$$

Due to limitation of resources, only 50% of the sample were studied thus, 34 questionnaires were administered, 17 questionnaires for each market. This is because this was a case study and that was a representative study showing what was happening on the ground to a larger scale, thus the small sample size.

2.6. Sampling Techniques

Convenience sampling was used in the picking of markets. This method was considered appropriate since it allowed each member of the targeted population to have an equal chance in being included in the sample. It also avoided sampling bias since the subjects were picked randomly. At the market, traders during the weekend and weekdays were requested to take part in the study, and those who were willing, were included in the sample.

2.6.1. Inclusion Criteria

Inclusion criteria involved traders, that is, the sellers in Muthurwa and ODM open air markets, traders (sellers) who consented to participate in the study and traders (sellers) present in the markets during the research period.

2.6.2. Exclusion Criteria

Exclusion criteria involved traders (sellers) absent during the research period, new traders (sellers) and those recently transferred to the market and all traders (sellers) who did not consent to the study.

2.7. Research Tools

A self-administered semi-structured questionnaire was administered to collect the data on public health hazards and risks in the markets as well as the knowledge on health effects and the need to work in healthy markets. The questionnaires were distributed to the selected respondents by the researcher and the respondents advised to seek help on clarity of issues. The variables tested included public health hazards, knowledge on health effects and the need to work in healthy markets.

2.8. Data Management and Analysis

Data analysis was done by the use of MS excel. Means, frequencies and percentages of collected data were computed, and the results were presented in the form of graphs, and tables.

2.9. RESULTS AND DISCUSSION

2.9.1. Introduction

This chapter deals with analysis and presentation of data collected on research conducted to investigate presence of health hazards in Muthurwa and Narok main market (ODM) open air markets and the effects they pose, as well as the levels of knowledge and awareness on the need for working in healthy markets. Data presentation has been done through the use of tables, pie charts and bar graphs. A discussion has also been given based on the objectives of the study.

2.9.2. Demographic Information

Thirty-four (34) questionnaires were administered, seventeen (17) for each market, but only thirty questionnaires were returned, and so the response efficiency was reduced to thirty (30%).

2.9.3. Gender and Working Duration

From Table 1, females in both markets were by far more than the males, since the females were 67% in ODM market and 60% in Muthurwa market, compared to 33% of males in ODM market and 40% of males in Muthurwa market, indicating that majority of the sellers in the markets were females due to factors such as demographics among others. However, there was no gender bias since both females and males were involved in the study.

Most respondents had worked in the market for above two years, Muthurwa and ODM (47%) compared to those who had worked between one year and two years, ODM (20%), Muthurwa (27%) and those who had worked less than one year, ODM (33%), Muthurwa (27%) from Table 1. This statistic was significant to the study, because, with a greater percentage of the respondents having worked in the market for above two years, they were well conversant with the market and the challenges therein.

Table 1 Demographic Information

Characteristic/ Market	**Gender**		**Working Duration**		
	%Male	**%Female**	**% < 1 yr**	**% 1-2 yrs**	**% > 2 Yrs**
ODM	33	67	33	20	47
Muthurwa	40	60	27	27	47

2.10. Health Hazards Present in The Market

2.10.1. Market Attendance

From figure 1**,** majority of the participants in ODM market, attended the market daily (73.3%), while (13.3%) attended on weekdays only, with (13.3%) attending on the weekends only. From this information, it was clear that most participants depended on what they got from the market as their source of livelihood since they attended the market on a daily basis. Similarly, most of the participants in Muthurwa open air market attended the market daily (73%), compared to those who attended on weekdays only (20%) and those who attended on the weekends only (7%). This could be due to various reasons such as religious affiliations or those who did not attend on a daily basis had other occupations. This differed from Chatuchak market which was only busy in the weekends when it opened (Wejwithan et al., 2017). This implied that the majority of the participants in this study attended the market daily, thus were well conversant with what happened in these markets.

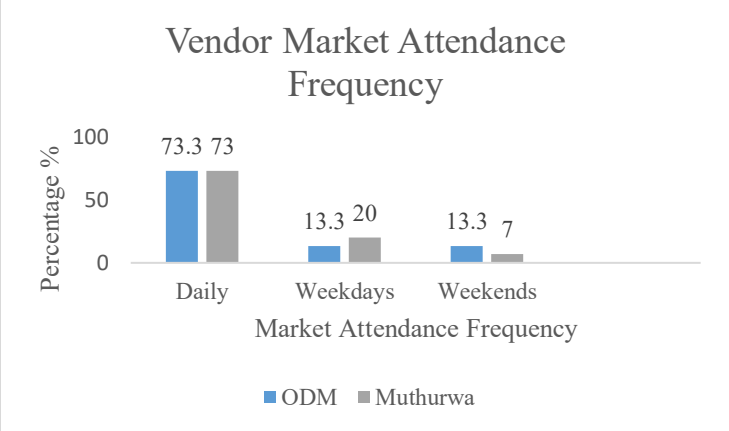


Figure 1: Market attendance of respondents in both Markets

2.10.2. Busy Time of The Market

The operating durations of the markets were presented in table 2. Based on the findings, most respondents argued that the markets were mostly busy in the morning, ODM (40%) and Muthurwa (67%) compared to the afternoon for both markets (6%) and in

the evening, ODM (27%) and Muthurwa (7%) and throughout the day, ODM (27%) and Muthurwa (20%). This trend could be attributed to the presence of resellers who arrived early to source fresh produce and other commodities for their businesses. The significance of early market activity aligned with broader economic behaviors observed in many open-air markets, where vendors and buyers prioritize early trading to access quality products at lower prices before stock depletion occurs (List, 2009).

In contrast, there was a lull in market activity in the afternoon in both markets which could be attributed to factors such as general tendency of customers to shop either early in the morning or later in the evening. ODM market was busy in the evening, because of its strategic proximity to town thus when people leave their jobs, they passed through the market to buy their foodstuff.s This differed from Chatuchak market which was mostly crowded in the mid-morning since it only opened over the weekends (Wejwithan et al., 2017). This contrast underscored how market dynamics are influenced by local cultural and economic factors, providing a global perspective on how operational models can differ.

Table 2: Busy time of the market

Busy Time of The Market	ODM (%)	Muthurwa (%)
Morning	40	67
Afternoon	6	6
Evening	27	7
Throughout The Day	27	20

2.10.3. Presence of Health Hazards and Challenges in The Markets.

According to figure 2, most respondents in both markets agreed that there were hazards present in these markets, ODM (80%) and Muthurwa (73%), compared to those who said there were no hazards present in these markets, ODM (20%) and Muthurwa (27%). These findings were significant to the study objectives, since the study aimed at identifying the hazards present in these open-air markets. The respondents in ODM market listed some of the hazards they faced in the market as, water shortage, inadequate sanitation facilities (toilets) and those that were there were not clean, poor waste management, since they dumped their wastes just outside the market, there was also untidiness in the market, which brought houseflies. The respondents also argued that, there were no stalls for them in the market and this brought congestion in the market. These findings differed from those of Helgerson (2012), who argued that open air markets in Ethiopia, operate in juridical space and have an organized system of sections that sold similar products most of which were agricultural.

The respondents in Muthurwa market listed some of the hazards in this market as, poor drainage, especially when it rained, it led to flooding at the entrance of the market thus making the market inaccessible. Another challenge is that they did not have a place to leave their foodstuffs in the evening when they left the market for their homes, they just covered it and left it there. This information corresponded with that of Ogeya (2013), who observed that there was the challenge of encroachment of open-air markets by other illegal businesses such as car parking and car washing. (Muthoka (2006), also noted that contracting of private sector entities in solid waste management could be an option but was riddled with corruption and nepotism.

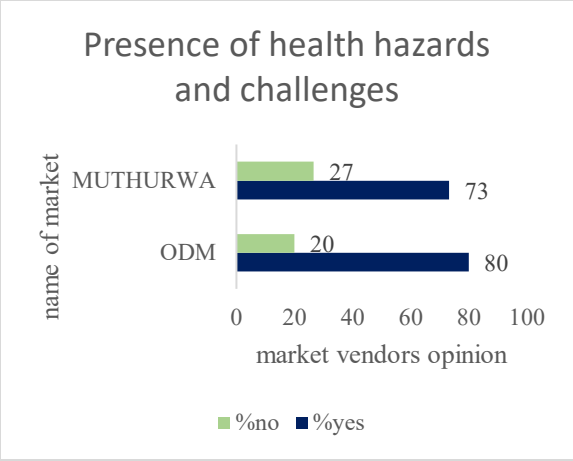


Figure 2 Health hazards present in the markets

2.10.4. State of Health Hazards in The Markets

From table 3, a greater percentage of the respondents in ODM market, claimed that the hazards were a challenge that was being tolerated (40%), as the local authorities and the different stakeholders involved in the market were aware of the challenges but there was no action taken to help surmount them. The respondents in Muthurwa market, had a greater percentage claiming that the state of the hazards was a worsening challenge (40%), since the challenge of the poor drainage occurred only when it rained and they did not face the challenge in the dry season.

Table 3 State of the hazards in the markets

State of the Health Hazards	ODM (%)	Muthurwa (%)
A worse challenge	13	0
A worsening challenge	20	40
A challenge being tolerated	40	26
Slightly beginning to be a challenge	7	7
No challenge at all	20	27

2.11. Causes of Hazards

According to table 4, most of the respondents argued that the hazards present in the markets were brought about by a combination of different factors including, lack of proper planning, lack of coordination and cooperation between the different stakeholders involved and lack of community involvement and participation. This was contributed to by different political interests among the involved stakeholders such as the local authorities.

The findings corresponded with those of previous studies, for instance, Amuko (2014) noted that weak or inadequate coordination framework, was the main cause of inadequate trading space and poor sanitation facilities in Kawangware market in Nairobi. Generally, poor design as a result of non-consultation of traders in the design of open-air markets leads to the hazards in the markets (Ogeya, 2013).

Table 4: Causes of the hazards.

Causes of the Hazards	ODM (%)	Muthurwa (%)
Lack of Proper Planning	20	20
Lack of Coordination & cooperation	27	27
Lack of community involvement and participation	6	6
All the above	27	27

None of the above	20	20

2.12. Impacts of The Hazards

2.12.1. Effects on Health

From figure 3, the respondents in ODM market, agreed that these hazards, risks and challenges had an effect on their health (67%), compared to those who said there were no effects (33%). These hazards affected them, for instance the issue of dumping wastes just outside the market brought a foul smell, lack of clean sanitation facilities and lack of adequate water could bring about diseases such as cholera and typhoid as well as diarrhea. This in turn affected their performance in the market and could at times hinder them from attending the market on certain days. The findings were significant to the study because one of the objectives of this study, was to determine how these public health hazards affected the health of the people working in these open-air markets. The respondents in Muthurwa market, had a greater percentage saying that these hazards did not affect them in terms of health (53%), compared to those who agreed that the hazards affected them (47%). This was because their major challenge was that of poor drainage and at most times, they dug trenches on their own to make way for the water to flow.

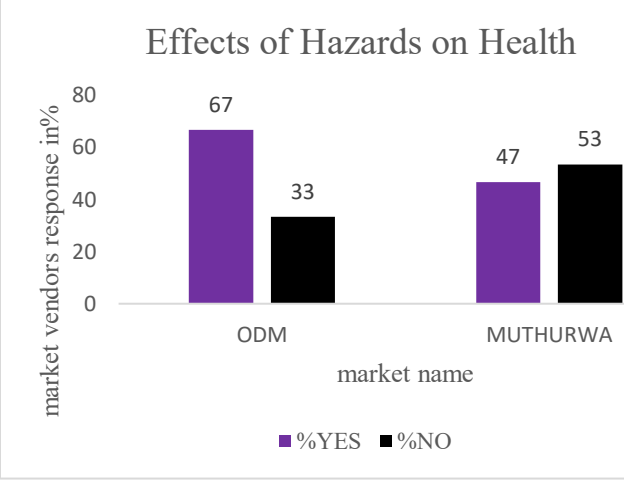


Figure 3: Effects on health

2.12.2. Effects on the Environment

From figure 4, respondents in both markets agreed that these hazards present in the markets affected the quality of the environment, ODM (67%) and Muthurwa (80%). Hazards such as dumping of wastes just outside the market, lack of proper drainage systems affected the quality of the environment since it led to environmental degradation. The top soil was carried away when there was runoff in the market, the dumping of waste could lead to contamination of groundwater through leaching. This in turn, ends up affecting the environment and making the environmental quality poor.

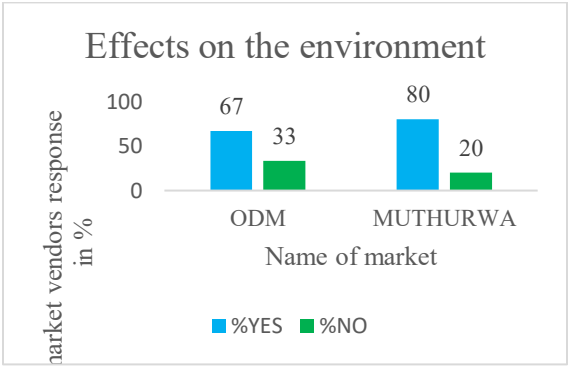


Figure 4: Effects on the environment

2.12.3. Opinion on Working Conditions

Respondents in ODM market, had the same percentage of 33.3% of their opinion on the working conditions for good, average and poor working conditions, although there was no respondent who said that the working conditions were very good, from figure 4.5. This implied that the working conditions of these markets were tolerable and the sellers in these markets could cope with the conditions whether good or poor. This was significant in understanding the health hazards present and the risks to those involved.

From figure 5, according to the respondents of Muthurwa market, the working conditions

of this market were by far average (66.7%), compared to those who said they were good (20%) and those who said they were poor (13.3%). These findings were significant to the study, because if the working conditions of the market are average, it means they needed to be improved to be better and thus possible recommendations could be suggested on how to improve these working conditions, in line with the objectives of the study.

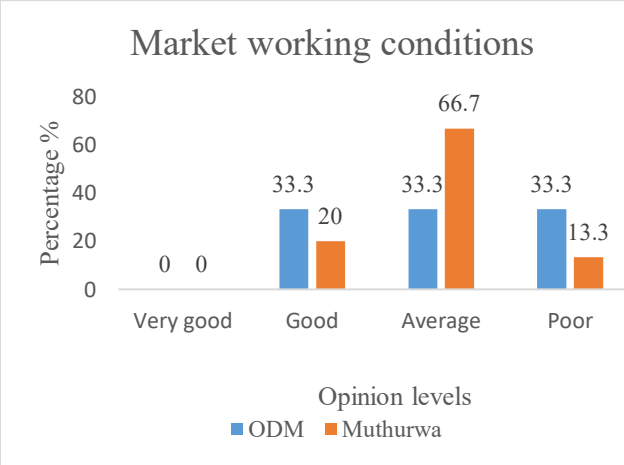


Figure 5: Working conditions in ODM market

2.13. Levels of Knowledge and Awareness

2.13.1. Awareness on The Need for Working in Healthy Markets

From figure 6, respondents in both markets are aware of the need for working in healthy markets, ODM (73%) and Muthurwa (80%). Most of the respondents argued that when they sold their commodities in clean markets, they attracted more customers and this made business for them to boom. Healthy markets also promoted clean environments and presented healthy conditions to work in, according to the respondents in both markets. This was significant to the objectives of the study since; the study aimed at establishing the levels of knowledge and awareness of the need of working in healthy markets among the sellers in these markets.

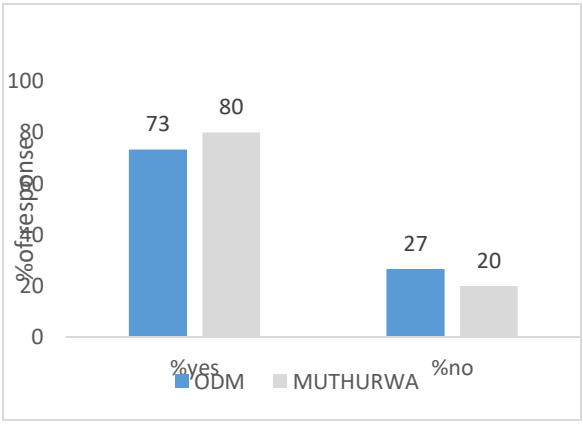


Figure 6 levels of awareness on working in healthy markets

2.13.2. Public Health Standards Met

From table 5, the respondents in both markets by far agreed that the public health standards in these markets were not met, ODM (66.7%) and Muthurwa (60%), compared to those who said the standards were met, ODM (33.3%) and Muthurwa (40%). The implication of these findings was that the sellers in these markets were aware that the public health standards of these markets were not met but they worked in them anyway. According to the respondents, this was due to reasons such as; different commodities were mixed up in the market, yet there should be different sections in the market to sell different commodities to avoid mixing up because this in the long run ended up contaminating the foodstuffs in the market.

Table 5: Public health standards met

Response of Respondents	ODM (%)	Muthurwa (%)
Yes	33.3	40
No	66.7	60

2.13.3. Need to Increase Awareness

From figure 7, a greater percentage (80%) for both markets of the respondents by far agreed that it was necessary to increase awareness in the market on the need for working in healthy markets and the ways of maintaining proper public health standards in these markets. This would in turn help improve the working conditions of these markets. Some of the opinions that the respondents gave on how to improve these standards were, giving regular trainings and seminars for the people working in these markets.

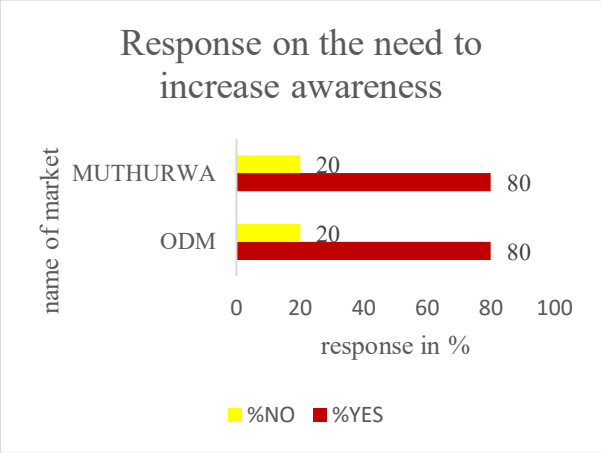


Figure 7: Response on the need to increase awareness

2.13.4. Improvement of Working Conditions

From figure 8, the respondents in both markets agreed that there was a need to improve the working conditions in these markets. (80%) of the respondents in both markets gave a positive response and they all agreed that there was a need to improve the working conditions such as, ensure there was adequate flow of water in the markets, ensure that the sanitation facilities in these markets were kept clean throughout, as well as provide a proper drainage system for these markets to improve Occupational Safety and Health (OSH) and prevent injuries and falls when it rained (Hutton & Chase, 2017).

This implied that the objectives of the study would be met since possible suggestions and recommendations on how to improve the working conditions of these open-air markets, were given. These findings relate to the WHO Healthy markets initiative where a common approach for improving markets is the upgrading of the environment through construction of buildings and roads, provision of water supplies and improved drainage (Hutton & Chase, 2017).

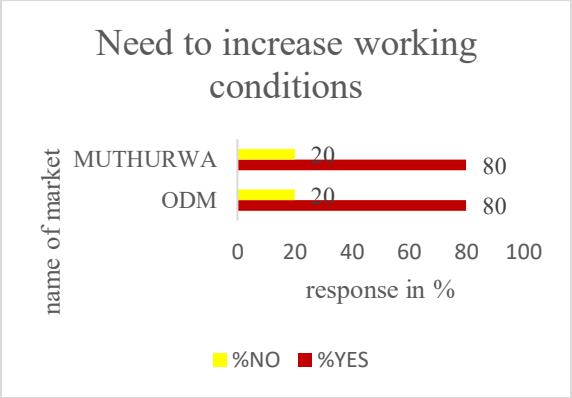


Figure 8 response on the need to increase working conditions in these markets.

2.14. Conclusion

This study was aimed at identifying the health hazards and risks present in open air markets, the effects that these hazards and risks pose to the people working in these markets, the levels of knowledge and awareness on the need for working in healthy markets as well as suggest possible recommendation measures. From the findings of this study, the following can be concluded;

Both Muthurwa and Narok main market (ODM) markets were open daily and were busy throughout the day. However, there were challenges, risks and public health hazards present in these markets which affected the health of the sellers as well as the quality of the environment leading to environmental degradation. Some of the challenges that the respondents faced are

listed as follows: poor waste disposal, inadequate sanitation facilities and water shortage for Narok main market. Some of the challenges the respondents in Muthurwa market listed were, poor drainage especially when it rained making the market inaccessible. These hazards were brought by lack of proper planning, lack of community involvement and participation especially on matters relating to the market as well as lack of coordination.

Although the sellers in these markets had little knowledge on the need for working in healthy markets, there was need to increase the awareness to the people working in these open-air markets, improve the public health standards in these markets as well as improve the working conditions in these open-air markets.

2.15. Recommendations

From the findings of this study, it was recommended that; Public education sensitization and awareness should be made among all the stakeholders, that is, the County Government, the market leaders, the sellers in the markets, public health officers and all other people involved in these markets to increase the levels of knowledge. There was also a need to improve the working conditions of these markets, through means such as, provision of adequate stalls for all the sellers in the markets, providing a safe and clean way of waste collection for the wastes generated from these markets, ensuring continuous or frequent flow of water, providing proper drainage systems for the markets to avoid flooding. Finally, there was a need to ensure that all the members of the market and sellers in the market were consulted and actively involved and their opinions sought in all matters relating to the markets.

2.16. Acknowledgement

I wish to acknowledge the efforts of my supervisor, for her guidance, constant encouragement and availability during my study work. I give my appreciation for her suggestions, comments and invaluable contribution towards my progress.

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